und Funktion and Voss's Ueber das Wesen der Mathematik, by R. D. Carmichael; M'Lachlan's Practical Mathematics, by T. E. Mason; Klein's Elementarmathematik vom höheren Standpunkte aus, Teil II., Netto's Elementare Algebra, Gans's Einführung in die Vektoranalysis mit Anwendungen auf die mathematische Physik, and Rothe's Darstellende Geometrie des Geländes, by T. H. Gronwall; Borel's Le Hasard, Ingersoll and Zobel's Introduction to the Mathematical Theory of Heat Conduction, and Duhem's Le Système du Monde, Tome I., by R. D. Carmichael; Lecornu's Cours de Mécanique, Tome I. and Guichard's Problèmes de Mécanique et Cours de Cinématique, by W. R. Longley; "Notes," and "New Publications."

The May number of the *Bulletin* contains: Report of the February meeting of the society, by F. N. Cole; "The Legendre condition for a minimum of a double integral with an isoperimetric condition," by C. A. Fischer; "Note on the derivative and the variation of a function depending on all the values of another function," by G. C. Evans; Review of Sommerville's Elements of Non-Euclidean Geometry, by J. L. Coolidge; Review of Minkowski's Collected Works, by E. B. Wilson; "Shorter Notices": Bioche's Histoire des Mathématiques, by D. E. Smith; Richardson's Solid Geometry, by R. B. Robbins; Hall's Geometrical Vector Algebra, by F. L. Hitchcock; Prescott's Mechanics of Particles and Rigid Bodies, by W. R. Longley; Annuaire pour l'An 1915, publié par le Bureau des Longitudes, by E. W. Brown; "Notes"; and "New Publications."

The June number of the *Bulletin* contains: Report of the April meeting of the society at Chicago, by H. E. Slaught; "A geometric derivation of a general formula for the southerly deviation of freely falling bodies," by W. H. Roever; "Note on solvable quintics," by F. N. Cole; Review of the Madison Colloquim Lectures on Mathematics, Part I., by O. E. Glenn; "Some books on calculus" (Granville, Snyder and Hutchinson, Davis, Vivanti), by E. B. Wilson; "Notes," and "New Publications."

SCIENTIFIC RESULTS OF THE TERRA NOVA EXPEDITION

The British Museum has undertaken the publication of the Natural History results of the British Antarctic Expedition of 1910, better known as the Terra Nova Expedition. These results will be issued in parts as fast as they are prepared. The first part to be printed is a description of the fossil plants by Professor A. C. Seward of Cambridge.[1]

An especial interest attaches to the small collection of geological specimens that were retrieved after the tragic death of Captain Scott and his heroic associates, and the present publication bears ample testimony to the fact that their efforts have not only furnished the world with a lasting monument to British pluck and manhood but have also yielded facts of the greatest scientific interest.

Although determinable fossil plants are few in number traces were seen, as well as numerous carbonaceous laminæ and small seams of coal, at a number of widely separated localities, particularly in what is called the Beacon sandstone, which at latitude 85° S. is 1,500 feet thick. This comprises an upper 500 feet of sandstone resting on 300 feet of interbedded sandstone and shale with several seams of coal, underlain by 700 feet of similar sandstone conglomeratic at the base. The character of the grains in the sandstone suggests wind action, and sun cracks and ripple marks have also been observed. This extensive formation has been traced from Mt. Nansen as far south as latitude 85°, a distance of over 700 miles.

The most significant plants are those representing the genus *Glossopteris* found at Mount Buckley or Buckley Island which is situated just west of the Beardmore Glacier in latitude 85°. These are partly referred to the widespread *Glossopteris indica* Schimper and in part described as a new variety of that species. There are also represented objects identified as those of *Vertebraria* and representing the axial organs of *Glossopteris,* and others doubt-

[1] Seward, A. C., "Antarctic Fossil Plants," British Museum (Natural History) British Antarctic (Terra Nova) Expedition, 1910. Natural History Report. Geology, Vol. 1, No. 1, pp. 1–49, tf. 1–6, maps A–C, pls. 1–8, 1914.

fully correlated with the scale leaves of the latter genus. From the Priestley Glacier rather indifferently preserved wood is described under the name *Antarcticoxylon Priestleyi* and considered as a new type probably Araucarian in its relationship. Winged pollen grains are described as *Pityosporites antarcticus*. These are suggestive of the Abietineæ, but may be those of the Podocarpineæ. The remainder of the collection has little interest beyond its indication of the presence of arboreal forms in high southern latitudes.

The exact age of these plant-containing beds can not be definitely determined from the present collections, although there is no reason to doubt the legitimacy of the author's conclusion that the Beacon sandstone is probably Permo-Carboniferous in age with the further possibility that its upper part may be early Mesozoic.

The demonstration of the former presence of *Glossopteris* in Antarctica is of the greatest importance. It may be recalled that during the late Devonian or early Carboniferous a flora that may be called a cosmopolitan flora, characterized by such genera as *Bothrodendron, Archæocalamites, Archæopteris,* etc., has been found in Ellesmere Land, Spitzbergen, Greenland, Europe, North and South America, South Africa and Australia. Late in the Upper Carboniferous the floras of the world may be segregated into a northern province, of the cosmopolitan type and a southern province characterized by the *Glossopteris* flora as Neumayr termed it or the *Gangamopteris* flora as christened by David White. This latter flora, associated with glacial climatic conditions, has now been recognized from Australia, Tasmania, India, Madagascar, South Africa and South America. Its presence in Antarctica supplies an important link in the chain connecting the now isolated land masses of the southern hemisphere and also suggests the possibility of this flora having originated on the broad bosom of the Antarctic continent.

An elaboration of this theme would be out of place in the present notice. It has been somewhat fully discussed by Professor Seward in the present connection and it was also fully discussed by David White[2] in 1907 in connection with his study of the flora of the coal measures of Brazil. Arber's general account[3] of the *Glossopteris* flora, which was reviewed by me[4] in these columns brought the subject down to about 1904. All of these works contain full bibliographic references to which the reader who desires to pursue the subject further is referred.

When the late Professor Heer published his first account of the Arctic fossil floras the greatest scientific interest was aroused. We have now come to see pretty clearly that existing climates may be regarded as the exception rather than the rule when geologic time is considered as a whole. This coupled with the already described accounts of Jurassic, Cretaceous and Tertiary plants from the Antarctic continent opposite from Victoria Land[5] tends to make the discoveries announced in Professor Seward's paper seem normal and just what we should have expected. This is, however, somewhat offset by the tragedy of the Scott expedition, and it should further be remembered that demonstration has now replaced speculation and we now have a groundwork of solid facts of great importance that promise much for the future.

EDWARD W. BERRY
JOHNS HOPKINS UNIVERSITY,
BALTIMORE

SPECIAL ARTICLES

A BOTANICAL INDEX OF CRETACEOUS AND TERTIARY CLIMATES

IN studying the distribution of Dicotyledons in the principal phytogeographical regions of the earth the writers have encountered certain

[2] White, David, "Permo-Carboniferous Climatic Changes in South America," *Jour. Geol.*, Vol. 15, pp. 615–655, 1907.

[3] Arber, E. A. N., "Catalogue of the Fossil Plants of the *Glossopteris* Flora in the Dept. of Geology, British Museum (Nat. Hist.)," London, 1905.

[4] Berry, E. W., SCIENCE, N. S., Vol. 23, pp. 780–782, 1906.

[5] Berry, E. W., "Some Paleontological Results of the Swedish South Polar Expedition under Nordenskiold," SCIENCE, N. S., Vol. 38, pp. 656–661, 1913.